Vol.XVII No.9 November 1988 Second class postage paid at Canton, Texas Postal identification statement, page 2

Published by Jim Cranshaw, N5FSL Monthly except July and August

Price $12.50 yearly Single issue $1.50 Published since 1972

(214) 848-0304

THE HORN SPEAKER

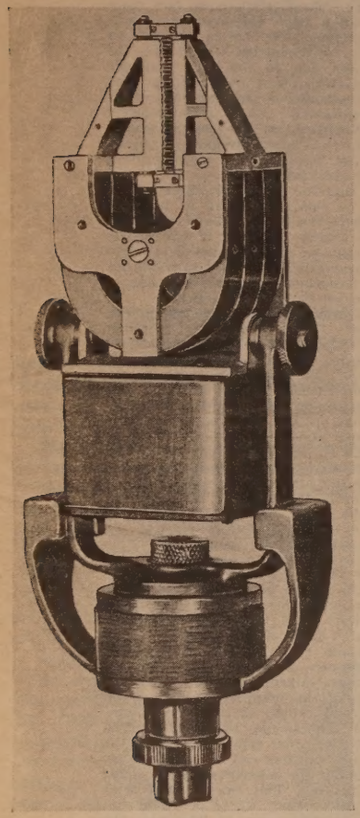


Fig. A
An excellent photograph illustrating the assembly of the Velocity Microphone. The three permanent magnets support a magnetic frame between which the corrugated, duraluminum strip vibrates, as shown above at the top.

Fig. B
An illustration of the flexibility possible in placing the artists with the new microphone. In the older types, it was necessary for all the artists to face the front of the microphone, but with the Velocity microphone, the artists may be anywhere around it.

THE VELOCITY MICROPHONE

All of the microphones developed and used in the past utilize, for their action, the pressure variations of the impressed sound. In this latest development, the action of the microphone depends upon the velocity of the impinging wave.

By J. P. TAYLOR*

FROM the early days of broadcasting, the studio microphone has presented the hardest problem engineers have had to meet in their constant efforts to improve broadcast fidelity. Early carbon types were unreliable and of poor quality. They were improved upon—but were never entirely satisfactory because of their high background noise and susceptibility to blasting. Meanwhile, speech input and transmitting equipment capable of reproducing faithfully the range of frequencies from 30 to 10,000 cycles had been developed. A microphone of equal range was imperative.

The condenser microphone was the answer. Transmitting with fair fidelity the entire range, it presented a real advance and soon became an accepted standard. Recently other types of microphones have been introduced. These have had about the same characteristics as the best condenser microphone but have had an advantage (under certain circumstances) in that they did not require a closely linked amplifier.

Despite the 30-to-10,000-cycle range of the condenser and other recent types of microphones, they did not satisfy the more discriminating engineers. The frequency curves by which they were judged were fairly flat—but they were made by the actuator method. In this method of calibration, the pressure of the sound wave is simulated by a vibrating rod exerting a mechanical pressure on the diaphragm of the microphone. Engineers were openly doubtful of the veracity of this method—they thought they could detect in the reproduced signal whistles and lisps which could be due only to the unnatural accentuation of certain frequencies. They decided to check it by the Rayleigh disc method.

A pure sound wave of known frequency and amplitude is generated by the Rayleigh disc. Since this is essentially a sound wave in free space, it makes possible very accurate measurements of microphone response. As these engineers expected, these measurements showed all available microphones to have various peaks and dips. Having proved this, they had no difficulty in determining the reason.

All the microphones used up to this time employed a diaphragm which offered a relatively large and impeding surface to the passage of the sound waves. These waves were reflected by this surface and hence the pressure on the diaphragm was more complex than the direct sound pressure simulated by the actuator rod. Moreover, since the diaphragm was more or less recessed, cavity resonance occurred. In addition, the dimensions were such as to cause mechanical resonance of the diaphragm at audible frequencies and pressure doubling which accentuated the higher frequency. Obviously most microphone ills could be laid directly to the use of a diaphragm. With this in mind, engineers set out to develop a microphone which would be free of these shortcomings.

The Velocity Microphone

The Velocity Microphone has been dubbed "the microphone without a diaphragm." The description is appropriate for it emphasizes the radical difference in the construction of this new microphone. A less obvious, but also important difference, is that the sound waves, instead of being forced to pass around this microphone, actually pass freely through it. But more important than either of these constructional differences is the fact that it introduces an entirely new principle of microphone operation.

All previous types of microphones were actuated by a change of pressure on the diaphragm. They were, therefore, spoken of as being pressure-actuated. The Velocity Microphone is not. It is actuated by the *velocity of the air particles*. Thus, it is velocity-actuated—and from this derives its name.

The moving element in this new microphone is a thin metallic ribbon suspended between the poles of a magnet with its length perpendicular to, and its width in the plane of the magnetic lines of force. Permanent magnets are utilized and hence no field supply is necessary. The pole pieces of these magnets are so constructed and cut away as to allow free passage of the sound waves through the microphone. The ribbon element is made of thin duralumin and is so light that its motion corresponds to the motion of the air particles. It is suspended from metal cross-pieces which, in turn, rest on four insulating bushings. These bushings are the only non-metallic parts of the microphone. This construction insures that temperature and humidity changes will have no effect on the operation of the microphone. Moreover, it is sufficiently rugged so that it may be knocked over or dropped without impairing its operation.

Operation

The principle upon which the operation of the Velocity Microphone depends is relatively simple. The ribbon element is caused to vibrate by the air particles of a sound wave. Since this vibration occurs in a strong magnetic field, there is induced in the ribbon a signal voltage corresponding to the undulations of the impressed sound waves. This signal voltage is given by the expressions: $E=blx$; where b=flux density, l=length of ribbon, x=velocity of ribbon.

In this expression, B and l are, of course, constants. The velocity can be shown to be independent of frequency, as follows: The velocity in a mechanical system is the ratio of its pressure-gradient to the acoustic impedance. Both of the latter are proportional to frequency; hence their ratio, the velocity x, is independent of frequency. This being so, the signal voltage E will be independent of frequency and the response of the microphone uniform at all frequencies in the working range. The free-wave curve of the Velocity Microphone (Fig. 1) shows this to be approximately true.

Fidelity

The frequency range of the Velocity Microphone as measured by the Rayleigh Disc method is shown in Fig. 1. Examination of this curve shows that it is nearly flat from the lowest audible tones to beyond 14,000 cycles. The slight falling off at higher frequencies represents a difference which would not be detected by the ear. Moreover, since it is a smooth curve it may, if desired, be compensated for in the following amplifier.

For comparison, curves made on other types of microphones under identical conditions are also shown in Fig. 1. The peaks and dips, which engineers found caused the whistles and lisps, marring many broadcasts, are plainly evident. These peaks are traceable to diaphragm

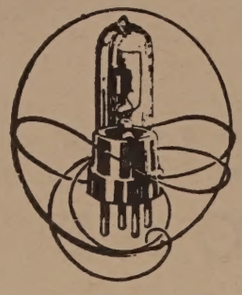
*Transmitter Sales Engineer, R. C. A. Victor Co.,

Beyond Rider!

"SUPER-HETS OF THE TWENTIES"

The number of super-het circuits offered the home-constructor in the late Twenties was awesome, and there has never been offered the hobby a sole-source of relevant data. Now, in response to a long series of requests D.H.MOORE has created another important contribution to the hobby - "Super-Hets of the Twenties". As with his other vintage radio writings, this massive Monograph combines scarce technical information and broad human interest. Among its contents are:

Armstrong
Braxton-King
Celco
Cough
Klentz
Madison-Moore
Mercury
Melo-Heald
Rauland
Robertson-Davis
Scott
Silver-Marshall
Tyrman
Ultradyne



Best
Camfield
Cockaday
Haynes
Lincoln
Magnaformer
Norden-Hauck
Quadraphase
Remler
Samson
Sargent-Rayment
St. James
Victoreen
Thompson

The fun of Radio is in doing it yourself

A rather large (200 pages) and lavishly illustrated Monograph is now ready for your further enjoyment of the hobby. A copy may be ordered from either of the addresses listed below, whichever is most convenient for you. The price is $25,ppd.

Olde Tyme Radio Company
2445 LYTTONSVILLE ROAD
SILVER SPRING, MARYLAND 20910

The Editorial Group, Ltd...
P.O. BOX 521 • PALO ALTO, CALIFORNIA

resonance, cavity resonance and pressure-doubling. All three result because of the use in all previous types of microphones of a pressure-actuated diaphragm.

Because the Velocity Microphone is a velocity-actuated device—does not utilize a diaphragm, it is subject to none of these undesirable phenomena. As a result its frequency response is a flat curve—and its reproduction is more natural than that of any microphone yet devised.

Directional Characteristic

The intensive study of studio technique, which many stations are making, has made the directional characteristic of the microphone used, of considerable importance. This results from the fact that this characteristic has two important effects. It determines, first, the placing of the artists, and second, the amount of reverberation picked up by the microphone. All previous types of microphones were very unsatisfactory in this respect. The condenser microphones, as well as more recently developed microphones in which the diaphragm supports an additional moving element, are entirely non-directional up to 2,000 cycles, while at higher frequencies they become very directional.

This is due to the fact that these microphones are pressure-operated—it is a phenomenon typical of all microphones using a diaphragm. Such a characteristic is, in fact, more undesirable than a pure non-directional characteristic throughout the entire range. In general, excess reverberation occurs at the lower frequencies due to the fact that the absorption characteristics of most material used in reducing reverberation are less efficient at the lower frequencies. Using a microphone which is non-directional at the low frequencies and directional at the higher frequencies means that the excess low-frequency reverberation will be further accentuated.

This means that the amount of direct sound pick-up must be relatively great in order to keep it well above the level of the reverberated pick-up. This entails crowding of the artists about the microphone and—because of the non-directional characteristics of such microphones at the higher frequencies—requires direction of the microphones on the point of action.

The Velocity Microphone is particularly good in this respect. It has a marked directional characteristic which is entirely independent of frequency. Due to this characteristic, the energy response of the Velocity Microphones to generally reflected sound is only one-third that of non-directional microphones such as the condenser and other pressure-operated types. This has a very important effect on the distance at which artists may be placed from the microphone. The maximum satisfactory distance is determined by the allowable reverberation.

Reverberation is the ratio of the generally reflected to the direct sound. The generally reflected sound is usually independent of the positions of source and microphone. As noted above, the Velocity Microphone reduces this by a factor of three. The direct sound varies inversely as the square of the distance, hence with this microphone the artists may be placed 1.7 times further away than they were with pressure operated types of microphones.

This advantage may be utilized in other ways. For instance, if the spacing of microphones and artists is kept the same, much less damping or absorbing materials need be used on the walls and ceiling in order to obtain, with this new microphone, the results previously obtained with other types. Moreover, the amount of reverberation can be adjusted as desired by turning the microphone at a slight angle to the source. This can be done with the Velocity Microphone where it could not with previous types, because it does not, like these latter, discriminate against the high frequencies when so used.

POSTAL IDENTIFICATION STATEMENT The Horn Speaker (USPS 956120) is published monthly, except July and August by Jim Cranshaw, Route 3 Box 79, Canton Texas 75103. Subscription rates $12.50 per year, $20.00 for two years. Second class postage paid at Canton, Texas. POSTMASTER: SEND ADDRESS CHANGES TO: THE HORN SPEAKER, P. O. BOX 1193, MABANK, TX 75147.

Subscribers, advertisers, photographers and writers, please use the following address:

THE HORN SPEAKER
P. O. BOX 1193
MABANK, TX 75147

STATE OF OWNERSHIP, MANAGEMENT AND CIRCULATION 1. Title of publication; THE HORN SPEAKER (USPS 956120). 2. Date of filing; October 1, 1988. 3. Frequency of issue; monthly except July and August. 3. A. Number of issues published annually; 10. 3. B. Annual subscription price $12.50. 4. Complete mailing address of known publication; Route 3 Box 79, Canton, Texas 75103. 5. Complete mailing address of the headquarters or general business offices of the publisher; same as above. 6. Full names and complete mailing address of publisher, editor and managing editor: all three; James (Jim) Cranshaw, Route 3 Box 79, Canton, Texas, 75103. 7. Owner (owned by one individual); same as above. 8. Known bondholders, mortgagees and other security owning or holding 1 percent or more of total amount of bonds, mortgages or other securities; none. 9. For completion by nonprofit organizations. 10. Extent and nature of circulation (first amount is average number of copies each issue during preceding 12 months, second amount is actual number of copies of single issue published nearest to filing date) A. Total number of copies (net press run); 1500, 1500. B. Paid circulation (1) sales through dealers and vendors; street vendors and counter sales; 321, 286. (2) mail subscriptions; 836, 855. C. Total paid circulation; 1157, 1141. D. Free distribution by mail, carrier or other means; samples, complimentary and other free copies; 75, 134. E. Total distribution; 1232, 1275. F. Copies not distributed (1) office use, left over, unaccounted, spoiled after printing; 268, 225. (2) return from news agents; none for both. G. Total; 1500, 1500.

VELOCITY MICROPHONE

Another feature not before mentioned is the bi-directionalism of the Velocity Microphone. The construction, which is open both in front and back, allows pick-up equally in both directions. As a result artists may be placed equally both in front and in back of this microphone. Thus it may be used to pick up programs in which twice as many artists participate.

Convenience

The Velocity Microphone does not require a built-in or closely linked amplifier. Its output may be fed to an amplifier located several hundred feet away in the control room. Moreover, mixing of the outputs of several of these microphones is entirely practical. Such a low-level switching arrangement reduces the number of amplifiers required with consequent economies in speech input cost.

Since it requires no field or polarizing supply, the connections from microphone to control room are extremely simple—only a two-wire cable being required. The unit itself is relatively light. It may be quickly and easily removed from the stand and carried to another position. As the unit has mounted on it a receptacle into which the cable plug fits, it is unnecessary to drag the cable around with the unit.

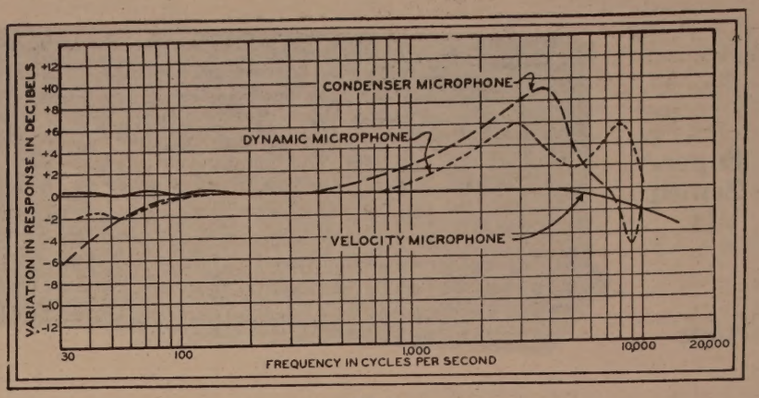


Fig. 1

Curves comparing the condenser, dynamic and velocity microphones.

RADIO-CRAFT for NOVEMBER, 1932

NEW TELEPHONE TRANSMITTER.

We give an engraving of a new transmitting telephone, patented by Mr. E. Berliner, of Boston, Mass., and owned and made by the American Bell Telephone Company, of that city. Fig. 1 is a front view and Fig. 2 a perspective view showing internal parts.

The instrument is very simple and compact, and has the all important advantage of not being liable to disarrangement.

The principal feature of the invention is the disposition of the carbon contact surfaces, one being attached to the diaphragm, the other being supported by a metal socket attached to a hinged plate secured to an arm that projects from the back of the mouthpiece downward over the diaphragm. This arm serves the double purpose of supporting the free carbon electrode and clamping the diaphragm in its place against the back of the iron mouthpiece. The diaphragm is bound around the edges with soft rubber, and is separated from the mouthpiece by a ring of pasteboard. The iron mouthpiece is hinged to a casting fastened to the circular box which contains the induction coil and supports the binding screws for the battery, line, and ground wires. To the front of the induction coil is attached a plate connected with the battery wire, and carrying a spring having in its free end a screw which bears against a spring connected with the center of the diaphragm and acts as a dampener as well as a conductor, through which the current passes to the carbon electrode at the center of the diaphragm. The battery current enters at one of the binding screws, passes through the primary wire of the induction coil, through the spring and carbon electrode at the center of the diaphragm, through the hinged electrode, metallic mouthpiece and its hinge, and back through a binding screw to the battery.

The variation of the current in the primary circuit occurs at the contact of the two carbon electrodes, the contact being varied by the vibration of the electrode attached to the diaphragm.

When the transmitter is used for long distance telephony, the pendent carbon electrode is made heavier, to reduce resistance in the local current and to amplify the electrical undulations.

The terminals of the secondary wire of the induction coil are connected with the two remaining binding screws, which are connected, one with the ground and the other with the line, in the usual way.

The accessory devices connected with this transmitter may be of the usual character. It will operate well with any of the well known forms of receiver, and is easily managed and thoroughly efficient. This transmitter has been well introduced, and large numbers of them are being used in Europe. They have been adopted on several of the leading German railways, and are extensively used in the German postal service.

Fig1

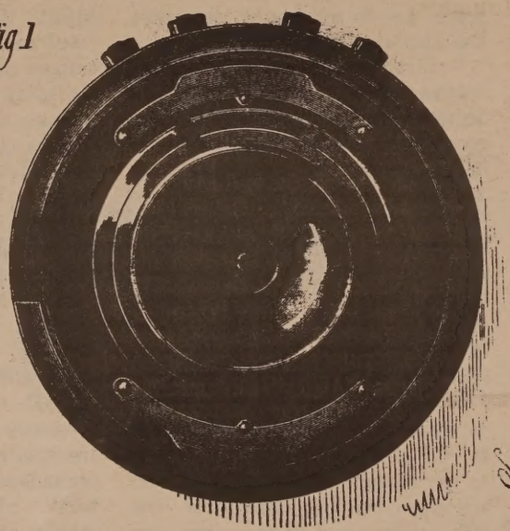
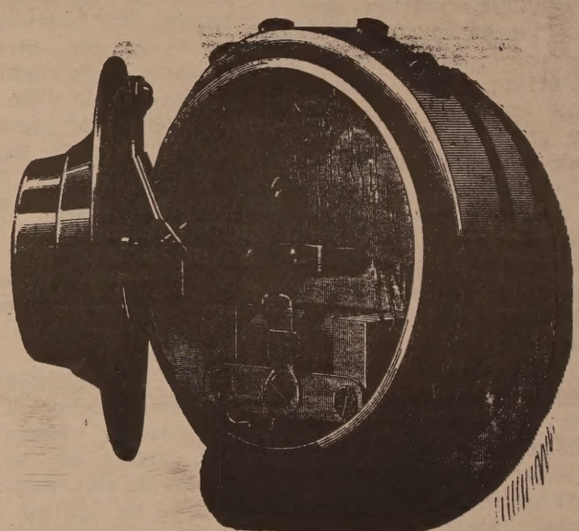
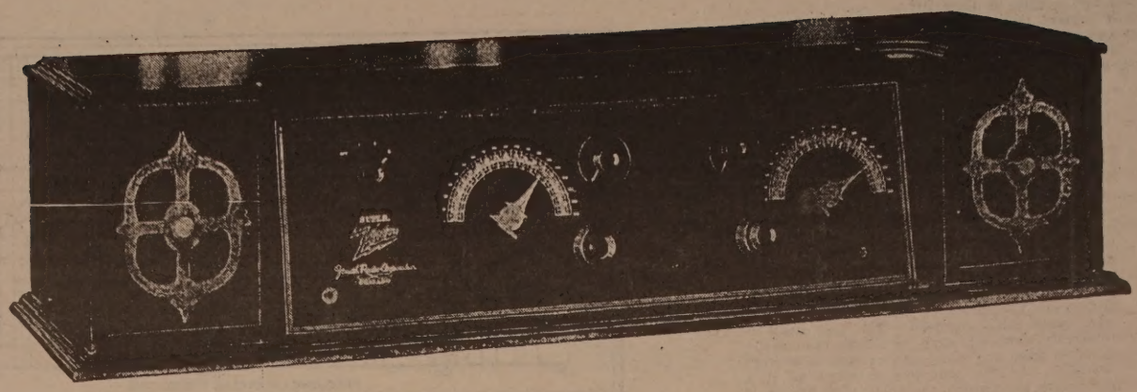


Fig.2



BERLINER'S TRANSMITTING TELEPHONE.

SCIENTIFIC AMERICAN, May 21, 1881



Super-
Zenith
VII

1924

Restoring Antique Radios

— OSCILLOSCOPE —

by D. M. Roth

This is the continuing part of an article designed to help you become familiar with operating your scope and interpreting the display. Beginning of article is the September 1988 edition. Here I discuss measuring AC voltages, frequency, distortion and interpreting the modulation envelope as seen in RF and IF stages of your radio. Waveforms that are typical of malfunctioning amplifiers are shown and possible cures for the problem are given.

*** INITIAL SCOPE ADJUSTMENTS

For initial adjustments refer to "Restoring Antiques Radios" by Durell Roth, THE HORN SPEAKER, September 1988.

*** AC MEASUREMENTS

Referring to figure 3a, connect a 6.3 volt filament transformer, as a signal source, to your scope. Set the vertical sensitivity to 5.0 volts and the horizontal sweep rate to 20 milliseconds. Plug the transformer into any convenient 120 volt, 60 cps, outlet. Slowly advance the sweep rate to 2.0 milliseconds to obtain a stable sine wave similar to figure 3b. With these control settings, the display of the 60 cycle per second signal has been expanded horizontally: you are seeing slightly more than one of those sixty cycles. With the expanded display, you can measure the frequency of the input signal and examine the basic waveshape for distortion such as clipping or noise. This is the type of analysis that you may need to do on the oscillator and IF signals in your receiver.

*** FREQUENCY MEASUREMENT

Frequency measurement with a scope is very simple. Mathematically, frequency is equal to 1.0 divided by the time or period of one cycle of the displayed signal. Referring to 3b, one cycle occupies 8.3 major divisions of the graticule or a period of approximately 0.01666 seconds (8.3 divisions multiplied by 2 ms per division). The frequency of the signal, therefore, is equal to 1.0/.01666 seconds for a frequency of approximately 60 cycles per second. The approximation is created by rounding the actual numbers in our example. The line frequency is exactly 60 cps. To obtain the frequency of any waveform simply divide 1.0 by the period of one cycle in seconds, milliseconds or microseconds.

*** AMPLITUDE MEASUREMENTS

When making AC amplitude measurements, remember that most volt meters are calibrated to display the root means square (RMS) value of the applied voltage and can only be used up to a frequency of one or two kilocycles. Your scope, on the other hand, displays the peak to peak (p-p) amplitude value of the applied voltage and can be used, depending on the scope, to measure the amplitude of signals with frequencies up to at least several hundred kilocycles. The p-p display is very convenient when working with radio. Many grid drive and other signal levels are specified in p-p values and can therefore be read directly from the scope display without calculation.

When necessary, the rms value of any sine wave is easily calculated and is equal to the product of 0.707 and the peak value of the display. Referring to figure 3b, rms is equal to 8.9 volts (one half p-p) times 0.707 or 6.29 volts.

*** RF MEASUREMENTS

Measuring RF is one of the most important uses of the scope in vintage radio service. The following experiments are designed to help you understand what the scope can do and how to interpret the display.

First, refer to "Restoring Antique Radios," THE HORN SPEAKER, September 1988 and set all scope controls as indicated in table I. Next, connect a signal generator and scope as indicated in figure 4a. Set the generator to produce a frequency of approximately 500 kc with no modulation and set the output amplitude control on the generator to zero. Advance the output control to produce a peak to peak scope display of approximately five vertical divisions. Slowly increase the horizontal sweep rate to 0.2 microseconds per division. As you advance the sweep rate, you are expanding the display of the 500 kc RF signal in the same way that you expanded the 60 cps signal in AC measurements.

With the expanded display of the RF signal, however, you can measure the frequency, frequency stability and check for waveform distortion in various sections of your radio like the RF and IF amplifiers and the local oscillator. For example, an oscillator signal should be pure sine wave. Distortion of the sine wave can indicate that the oscillator is malfunctioning and/or is being loaded by a defective component in the next stage. Oscillator and IF signal distortion can cause unusual symptions in a radio that are very difficult and tme consuming to locate. A simple inspection of these signals with your scope, as discussed later in this article, can save many hours of service time.

Next, compress the display by setting the sweep rate to 1.0 ms per division and turn on the modulation in the signal generator. Adjust the generator modulation level and the scoop sweep rate (and trigger controls if necessary) for a display similar to figure 4b.

——— NOTE ———

As the trigger LEVEL control is moved from AUTO the trace will temporarily disappear until the control is set to the critical trigger point where a stable display is obtained.

You are now looking at a waveform known as the MODULATION ENVELOPE. The signal is the result of combining (in your generator) the 500 kc RF signal and a low frequency audio modulation signal. The modulation process and thus the production of a modulation envelope takes place at the broadcast station and is beyond the scope of this article. Using your generator in this way, however, simulates a broadcast station and produces a simple modulation envelope for test purposes. The signal at the output of an RF or IF amplifier in a correctly operating radio is a replica of the signal transmitted by a broadcast station or your signal generator. The envelope, therefore, from your generator is similar to the air signal of a radio station and would be the

exact same signal seen in the RF and/or IF section of your radio if the station were transmitting in a single tone. If the generator is operating correctly, you will notice that the upper and lower halves of the display are identical to each other but opposite in polarity. The relative nature of the upper and lower half of the modulation envelope is very important and used to determine if or not the IF circuit in a radio is operating properly. Also notice that the outline of either half describes a sine wave. This sine wave is the modulation signal in your generator that is combined with the 500 kc RF signal to produce the modulation envelope. The modulating signal, from your generator or a broadcast station, is the audio or program that is ultimately heard in the speaker of your set.

Figure 4c is a typical modulation envelope observed in a correctly operating RF or IF stage when the receiver is tuned to a radio station. Figure 4d is the envelope in a malfunctioning RF or IF stage. The display is typical of an envelope in a set that is overloaded by the signal from the antenna because of an improperly adjusted RF gain control or a lack of AVC voltage.

(Continued next month.)

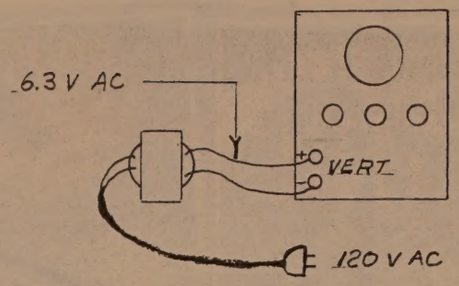


FIGURE 3a

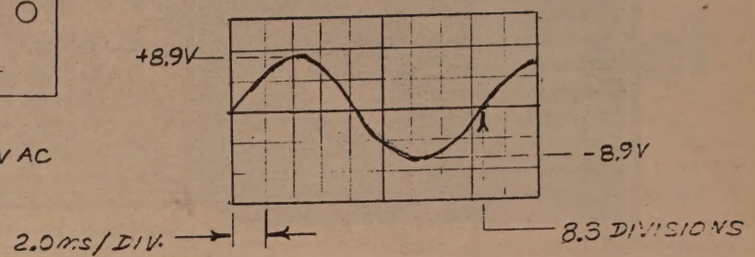


FIGURE 3b

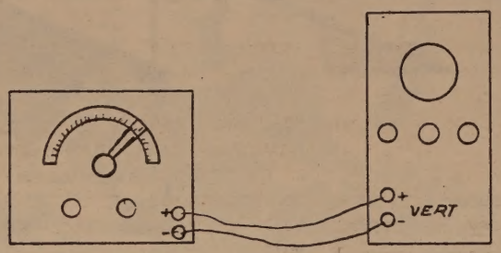


FIGURE 4a

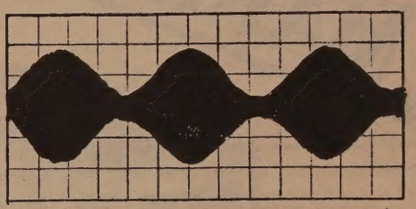


FIGURE 4b

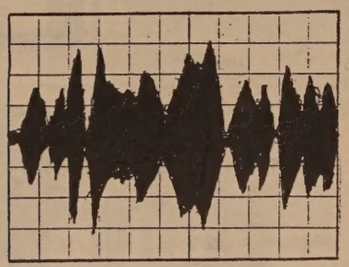


FIGURE 4c

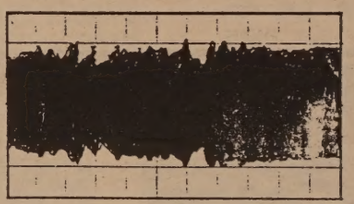
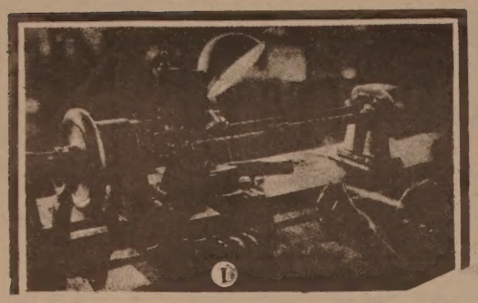


FIGURE 4d

A DIFFICULT HOOK-UP BODY CAPACITY A CHEAP CRYSTAL SET A GRID LEAK

RADIO-CRAFT June, 1932



By ARTHUR H. LYNCH
in collaboration with
EDWARD
CARON

MAKING OLD TUBES

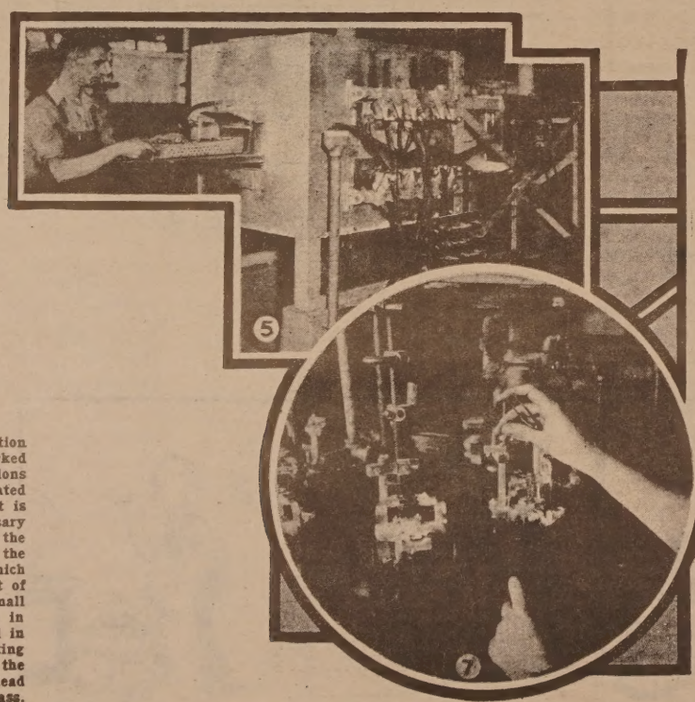
(1) This is an automatic grid winding machine. Two heavy support wires are run through a revolving head—at the extreme left of the picture. As these two support wires revolve, being driven by the motor which operates the revolving head, they pick up a fine wire which is run at right angles to the support wires and is equally spaced along the support wires. The spacing is automatically controlled for any particular type of tube for which the grids are to be used. This makes one long grid, the entire length of the support wires.

(2) *Cage Assembly*—The operator is using a foot-controlled electric welding machine. The upper arm of the welding machine makes contact with the metal elements which the operator is holding.

(3) *Cathode Assembly*—Here the operator is shown placing the special alloy filament wire into the Isolantite insulating sleeves.

(4) *Cathode Spraying*—After the operation shown in Figure No. 3, groups of the individual cathodes are placed in a spraying hood and given a coating of prepared chemicals by means of the spray gun which the operator holds in her right hand. The performance and the ultimate life of the heater-type tube depends, to a very large degree, upon the uniformity of the spraying mixture itself as well as the uniformity with which it is applied.

This is one of the most important operations of the cathode.



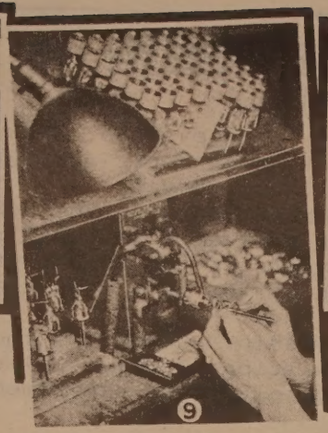
(5) *Hydrogen Furnace*—All of the small parts which have been shown in the foregoing photographs, as well as any other metal which is contained inside the glass envelope of the tube, are placed in this furnace before being assembled.

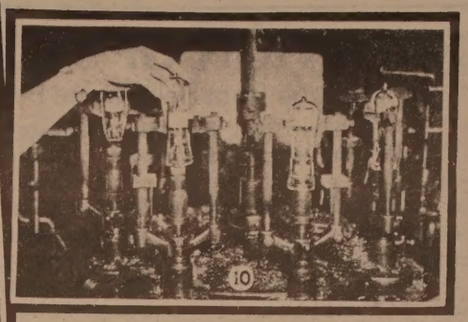
(7) *Stem Machine*—The operation shown in this picture is worked out in six different positions which are automatically rotated by the machine. The result is the inserting of the necessary lead wires which connect the elements of the tube to the prongs of the tube base, which in turn goes into the socket of the radio receiver. The small glass tube, which is shown in the operators hands, is used in a later operation for evacuating the entire tube. It joins the flare at a point where the lead wires are sealed into the glass.

(6) *Automatic Flare Machine*—Long lengths of glass tubing are placed in the revolving chucks which are shown at the top of this machine. These chucks feed the glass tube, at a predetermined, desired length, into a number of gas flames. There are eight sets of gas flames which the tube passes through from the time the operation starts until the flare is finished. Each different position is accompanied by an increase of temperature of the flame acting upon the glass tubing as the process develops. At the position shown directly before the operator is a revolving steel flare cutting disc.

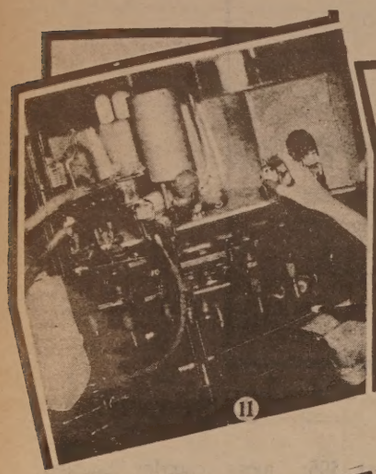
* Plant Superintendent, Triad Television Mfg. Co.

(8) *Automatic Stem Loader* — Stems taken from the machine shown in Figure 7 are then placed in this device which is controlled by a foot-operated clutch. When this machine is operated all of the lead wires are cut to the proper length.



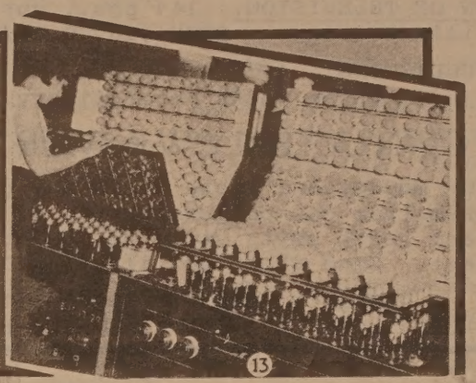


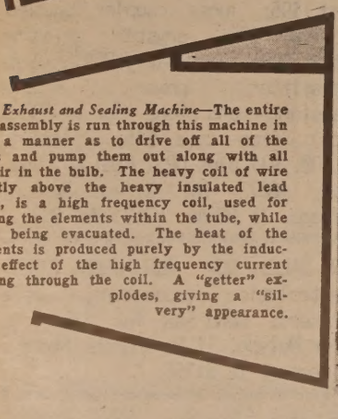
(10) *Sealing-In Machine*—The machine here is somewhat similar to the flare-making machine in that the operation includes passing the elements for the tube through a number of gas fires of gradually increasing temperatures.



(9) *Mount Assembly*— The operator in this picture is using a machine similar to the one shown in Figure No. 2. The difference lies in the fact that all of the assembly which has been finished by the process shown in Figure No. 2 is now joined to the rest of the elements, making a complete "Mount," ready for inserting into the glass envelope or bulb.

After the "Mount" is completed, the unit goes to the "sealing-in" machine.





(11) *Exhaust and Sealing Machine*—The entire tube assembly is run through this machine in such a manner as to drive off all of the gases and pump them out along with all the air in the bulb. The heavy coil of wire directly above the heavy insulated lead wires, is a high frequency coil, used for heating the elements within the tube, while it is being evacuated. The heat of the elements is produced purely by the inductive effect of the high frequency current passing through the coil. A "getter" explodes, giving a "silvery" appearance.

(13) *Aging Rack*—This highly interesting section of the production line indicates, by means of the banks of ordinary incandescent lamps, just exactly the condition of each tube as it comes through production. The finished vacuum tubes are placed in sockets which are connected to normal operating voltages. The current is then turned on and each tube has to be aged for a given period at specified voltages. If there is a short circuit between a plate and grid of one of the tubes, one of the lights in the bank to which that particular tube is connected indicates that fact to the operator. Other lights detect other troubles. This is true of any other flaws which might take place in the tube and the operator is therefore able to throw out those that are faulty.

(14) *Test Table*—A table, of this character, is at the end of each production line. It is fitted with nine delicate meters and is used to measure ten different characteristics of each tube. These test tables are of the very latest design and are the work of the Triad Engineering Staff.

(12) *Automatic Basing Machine* — Here, the completely evacuated and sealed assembly, taken from the former operation, is attached to the base. The base is already fitted with the requisite number of tubular metal prongs. The lead wires are put through these tubular prongs, by the operator, before the tube and the base are placed in the basing machine. The base, itself, is filled with a specially prepared cement. These assembled units are then put through a circular oven, which is held at a constant temperature.

(15) *Packing*—All of the highly developed Engineering work in a modern tube plant can be knocked into a "Cocked Hat" if the tubes are not satisfactorily packed. After shipping millions of tubes to all parts of the world the Triad Company has standardized on a system of wrapping.

flea market

AD SPACE:
Full page $50.00

Half page $25.00
Quarter page ...$12.50

Business size
card ads $1.00
Space per square
inch $0.60

CLASSIFIED ARE FREE
UP TO 100 WORDS. Additional words are 5 cents each.

***

THE INVENTION OF TELEVISION

. . . a new book from Bell Towne Publishing

It's been called the invention of the century -- television. Now you can have the story of the men who struggled against government indifference and stingy corporate bosses to bring us this electronic marvel.

Conceived in the 1800s and experimented on for 40 years in the U.S. and elsewhere, the television we know today is far evolved from the first crude images scientists transmitted in the early years of the 20th century. The construction of a modern electronic television system took more than 20 years and more than $40 million to accomplish.

Learn the true story behind the invention of Radio. Learn how the United States almost settled on another, less sophisticated color television system. And read the account of how an early television experiment nearly killed the inventor.

THE INVENTION OF TELEVISION: 144 pgs., pprbk, 44 rare photos 3 illustrations RUSH $10.00 ck/MO to:

BELL TOWNE PUBLISHING, 3314 Branard #31, Houston, TX 77098
Allow three weeks for delivery.

BUILD YOUR OWN ULTRALOW POWER TV TRANSMITTER

Now you can watch VCR movies and cable TV in any room of your house -- without wires! Transmitter can be constructed in less than one hour with parts available in any radio parts store for under $50.00. Transmitter has a range of 40 feet. Send $5.00 for illustrated instructions to:

ULTRALOW POWER TV TRANSMITTER
BELL TOWNE PUBLISHING, 3314 Branard #31, Houston, TX 77098

SCHEMATICS 1920-1960
RADIO/TV/HAM/MISC.

YOUR SATISFACTION OR
YOUR $3.50 REFUNDED.

ALTON H. BOWMAN
4172 EAST AVE., RD 2
CANANDAIGUA, NY 14424

WA 98021.

****

FOR SALE— RIDERS MANUALS, ABRIDGED (VOL. 1-5) AND VOL. 6 THROUGH 16 $275.00. VOL. 9, 10, 14 $20.00 EACH. ANTIQUE RADIO SERVICE, O. H. McDONALD, 2535 WEDGLEA #124, DALLAS, TX 75211.

****

SCHEMATIC $1.25 each, give make and model number. New manuals of old tubes, substitution guide, characteristic, VT numbers and pin out guide, Tubes, books, and parts. Send SASE to Housel, 1816 S.W. 12, lincoln, NE 68522.

****

ELECTRONIC ORGAN SCHEMATICS AND MANUALS. SASE FOR PRICE QUOTES. MANY MAKES AND MODELS. ALTON H. BOWMAN, 4172 EAST AVENUE, RD 2, CANANDAIGUA, NY 14424.

****

FOR SALE — GENERAL

****

MARLBORA, MADE BY RCA, 13 INCHES HIGH, 9 INCHES WIDE, 4 3/4 INCHES DEEP. (2) BOWLING BALL RADIOS. (3) SPEAKER DRIVERS- OTHER NOVELTY RADIOS— OLD BRASS FAN, WORKS. OLD GE TUBE REMOVER. ASSORTMENT ESCUTCHEONS, CROSLEY FIVER, CABINET. RUSSELL SCHOEN, E7340 NIETZKE ROAD, CLINTONVILLE, WI 54929. (715) 823-6744.

****

THESE ITEMS WILL MAKE FINE XMAS GIFTS. MARCONI - RCA - STOCK CERTIFICATE $32.00 — ACE RADIO OLD TIMER WITH HIS TEA KETTLE RADIOS, AND CATS IN COLOR SIZE 8" X 10" $22.00. WITH MAT $24.00. UNSOLD STOCK TUBE SETS WITH 029 CARTON FROM EARLY 1960 MADE IN U.S.A. GRANCO MODEL 604 FM. ADMIRAL Y 3443 AM. GE AM SET $27.50 EACH. HARD COVER SAGA OF THE VACUUM TUBE BOOK.FIRST EDITION 1977 $27.50. ALL PLUS POSTAGE OR U.P.S. — KRANTZ, 100 OSAGE AVE., SOMERDALE, NJ 08083.

****

MAJESTIC, model 25, ser.# 2B036224 Grigsby Grunow Co., radio on tall legs —— Western Auto Supply Company, model 929-48380, 50-60 cycle, 83 watts- console model- needs veneer work, lights up but doesn't play. has plug in for TV. G.E. tubes in chassis #001048. make offer. S. T. Mellas, Rt. 1 Box 119F, McNeal, AZ 85617.

****

LARGE MAHOGANY WALL TYPE TELEPHONE withshelf, magneto and bells. 30" high X 10" wide. Two carbon button mikes.. one double button and one single WESTERN ELECTRIC. Some blue Amberol cylinder records. Aeriola Senior radio, some plastics. R. Matson, RFD#1, Box 2943, Kennebunk, ME 04043. (207) 985-3751.

****

PHILCO CATHEDRAL MODEL 70, EXCELLENT, 01A TUBES, NEUTROWOUND BATTERY SET WITH SPEAKER, 2 OLD TELEPHONES. RUSSELL SCHOEN, E 7340 NIETZHE ROAD, CLINTONVILLE, WI 54929. (715) 823-6744.

****

RME 69 EARLY RECEIVER. rack mount, generally good, weak on 160 meter band $95; loose coupler, unusual replica $35; crystal grinding outfit $15; very early RCA/GE/Acme transmitter power supply transformer and choke (for Vu-202 & such) iron case $45; Polaroids $1.00@. All plus UPS. Paul C. Crum, W9LC, 6272 N. Cicero Avenue, Chicago, IL 60646. (312) 282-3033.

****

FOR SALE: NEW AND USED TUBES, Electrolytic capacitors, cone speakers. Send SASE for lists, C. Elmer Nelson, 11 S. Church Street, Princeton, IL 61356.

****

FOR SALE: ANTIQUE (1924 VINTAGE) ATWATER KENT BREADBOARD MODEL 10A IN ALMOST MINT CONDITION, WITH FIVE GOOD UX201A'S INCLUDING MODEL M HORN SPEAKER. WARRANTY AND INSPECTION TAGS ARE OK. $700.00 PLUS SHIPPING AND PACKING. PREFER NOT TO SHIP. WILL CONSIDER SELLING SET OR SPEAKER SEPARATELY. LEO GIBBS, W8BHT, 701 BROOKFIELD ROAD, KETTERING OH 45429. (513) 299-3965.

****

FOR SALE- New and used tubes, capacitors, cone speakers, have over 500 different types of tubes— used from 40 cents, new from 95 cents. Send SASE for lists, C. Elmer Nelson, 11 S. Church Street, Princeton, IL 61356.

****

RIDER RADIO MANUALS VOL. #6 TO #14

$18.00 EACH. NRW (RIDER) VOL. #1 $35.00. RCA VOL. II 1938 TO 1942 $25.00. HOWARD SAMS LOW #'S IN STOCK. RCA 100-A SPEAKER NEEDS CLEAN UP $25.00. AK E3 SPEAKER TEAR IN CONE $25.00. RADIO CITY TUBE TESTER MODEL 308 WITH 1B $25.00. HEATHKIT CON CHECKER MODEL C-3 - 1B $20.00. PACO - C-25 IN CIRCUIT CAP TESTER NO -1B $18.00. CENTURY IN CIRCUIT CONDENSER TESTER W/1B - MODEL CT-1- $15.00. HAVE 1000'S OF UNLISTED RADIO PARTS, TUBES, SERVICE MANUALS, KNOBS, SPEAKERS, NO LIST- WRITE WANTS. SASE FOR REPLY. SHIPPING EXTRA ON ALL ITEMS. MIN. ORDERS 7.50. RADIO SERVICE SINCE 1930. SASE FOR 4 PAGE LIST. KRANTZ, 100 OSAGE AVE., SOMERDALE, NJ 08083.

****

DANCING LADIES SPEAKER, Stewart Warner model 305, Stewart Warner speaker, American Bosch model 360, Silvertone model 1386, Philco 66, Clarion Jr. 320 superhetrodyne, small mirror tone deluxe," ivory colored radio with red knobs, case only for a Kennedy cathedral. Send for new list. Clifforf Schoen, 549 Fulton St., Seymour, WI 54165. Phone (414) 833-2429.

****

FOR SALE: RADIOLA MODEL II 225.00, 11 pr. Newcomb headsets 2.00 pr., Junker Magnavox TRF model D 15.00, 1930's Zenith junker tombstone 10.00, model 3970 Philco battery tombstone 15.00, UZ-1325 horn only 10.00, table model 1950's Admiral electric radio with phonograph 10.00, model 10728A Philco Transitone 10.00, late 20's American Bosch electric set with 8 tubes 50.00, 1950's Studebaker car radio 20.00, 1940's Zenith push button electric radio (plays) 25.00, U.P.S. extra, Larry Chambers, 5026 Suter Drive, Nashville, TN 37211, AC (615) 833-2448.

****

FREE: Send 2-stamp LSASE for just released Flyer, NO. 188c to: Olde Tyme Radio Company, 2445 Lyttonsville Road, Silver Spring, MD 20910.

****

MANY THOUSANDS OF OLD TUBES. LARGE 80, 81, 82, 83 BOXES OF WESTERN ELECTRICS RECEIVING AND TRANSMITTING TUBES, PEANUT TUBES, METAL TUBES, E. H. SCOTT TUBES, BOXES OF LOCTALS AND OCTALS. IV TUBES. ALSO FIRST EDITION RIDERS SUBSTITUTION GUIDE BOOK. ONLY SELLING ALL U PICK UP. TUNGAR BULBS. TO: BASIL ABBOTT, #4 BUNKER HILL, RICHARDSON, TX 75080.

****

FOR SALE: to receive America's best list of radios, tvs, mags, etc.. send $1.50 for current list to: Jim Clark Enterprises, Dept.,HS, 1292 Starboard, Okemos, MI 48864.

****

FOR SALE. MUST SELL MOST OF MY HOBBY: RADIOS, CONSOLES, TEST EQUIPMENT, AMATEUR RADIO RECEIVERS, TRANSMITTERS, PARTS, TUBES AND MAGAZINES. PLEASE TELL ME WHAT YOU WANT— CAN SEND LIST OF YOUR REQUEST FOR SASE. R. W. OLMSTED, K4UJZ, 608 W. THOMPSON LANE, MURFREESBORO, TN 37129. (615) 893-5344.

****

SEND LARGE SASE for list of radios., Donald Juleen, 6252 Ledge Road, Sturgeon Bay, WI 54235.

****

****

FOR SALE — PHILCO

****

PHILCO 95TH ANNIVERSARY limited edition cathedral radio, AM/FM transistor chassis, look a like to Philco model 90 - 1932- collector's item, only $89.91 plus $5.00 shipping. Maurer TV, 29 South 4th Street, Lebanon, PA 17042.

****

****

FOR SALE — TUBES, PARTS, ETC.

****

FOR SALE; NEW AND USED TUBES, CAPACITORS, CONE SPEAKER; SEND SASE FOR LISTS, C. ELMER, 11 S. CHURCH ST., PRINCETON, IL 61356

****

TUBES ONE-V 6.00, 6V5/6G5-6E5 12.00,6L6M 17.00, 6L6 GC 10.00, 6 and 12 V 3 and 4 prong vibrators 12.50 all ppd. H. f. Brammell, 204 E. Maple, Americus, KS 66835.

****

FOR SALE: TUBULAR MYLAR capacitors, axial leads: .5 mfd/ 600V - 5% $1.00 each (10/$9) — 1 mfd/ 600V $1.50 each (10/$12) — Tubular electrolytic capacitors, axial leads: 100 mfd/ 150 V 90 cents (10/$8) — 100 mfd/ 250V $1.00 each (10/$9) — 4700 mfd/ 35V $1.80 each (10/$15) — 4700 mfd/ 50V $2.10 each (10/$18) — 4 section twist lock capacitor 30-80 mfd/ 450V, 30/ 350V, 40/ 150V $2.90 each (10/$25) — N.O.S. Clarostat 500K volume control with switch and 3" universal shaft $3.90 each (10/$33) — N.O.S. Mallory 6 ohm - 4W wire-wound rheostat (for adjusting filament voltage of 201A tube) original box $6.00each (3/$16) — Also right angle PC mount DPDT slide switch 30 cents each (compartmented tray of 25/$5) — Jumbo red bright wide angle LEDS 4/90 cents — 9 V battery snaps 5/90 cents — Mini reed switch 3/90 cents — Add $2.00 shipping (orders over $20 sent postpaid) — Wisconsinites add 5%. Send LSASE or $1.00 (refundable) for illustrated Summer-Fall flyer listing over 1,000 tubes and parts. Don Diers, 4276-S2 North 50th Street, Milwaukee, WI 53216-1313.

****

30 DAY SALE: New tubes in original cartons $1.50 each. 1X2, 2BN4, 2CY5, 2FS5, 3AL5, 3AU6, 3BC5, 3BN6, 3BU8, 3BZ6, 3CB6, 3DK6, 3DT6, 3Q4, 4BC8, 4BQ7, 4CB6, 4EH7, 5AN8, 5AQ5, 5AT8, 5BK7, 5BQ7, 5BR8, 5CG8, 5CL8, 5T8, 5X8, 6AG5, 6AH6, 6AQ6, 6AS6, 6AT8, 6AX5, 6BA8, 6BC5, 6BC7, 6BC8, 6BH8, 6BK7, 6BN8, 6BQ7, 6BY6, 6BY8, 6CB6, 6CG7, 6CL6, 6CQ8, 6CS6, 6CZ5, 6DE6, 6DR7, 6DT5, 6DT6, 6DZ4, 6ER5, 6FH5, 6FY6, 6KA8, 6S4, 6V3, 7AU7, 12AD6, 12AF3, 12AX4, 12BH7, 12BQ6, 12BZ7, 12CA5, 16AQ3, 19J6, 25CD6, 25EH5, 35Z3, 50HK6. Add $2.40 shipping (Wisconsinites add 5%) Don Diers, 4276-S3 North 50th Street, Milwaukee, WI 53216-1313.

****

FOR SALE; NEW AND USED TUBES, capacitors, cone speakers, send SASE for lists, C. Elmer Nelson, 11 s. Church Street, Princeton, IL 61356.

****

FOR SALE: NEW IN ORIGINAL BOX, 215-A WESTINGHOUSE $30.00. ONE BRASSBASE UV-201-A TUBE EX. CONDITION POST PAID. $20.00 NO TIP USED. CLEON BOOTHE, BOX 235, COHOCTON, NY 14826.

****

LARGE STOCK OF TUBES FOR TV AND RADIOS 1940'S UP. NEW IN ORIGINAL BOXES. ALSO HAVE SOME TRANSMITTER TUBES. SASE FOR LIST. R. OLMSTED, 605 W. THOMPSON LANE, MURFREESBORO TN 37130. (615) 893-5344.

****

FOR SALE; UNUSED AND USED TUBES, cone speakers, electrolytic capacitors, phono cartridges and needles, send SASE for lists. C. Elmer Nelson, 11 S. Church Street, Princeton, Il 61356.

****

****

TELEVISIONS

****

RCA TV Model 8PT7010 in red metal case in working condition. Included second set same model for parts. Make offer. John Schellkopf, 1344 Goucher Street, Pacific Palisades, CA 90272.

****

****

FOR SALE — ZENITH

****

THE CABINET IS IN MINT CONDITION and the radio plays. It is a Zenith 12 tube superhetrodyne with a tuning range 540-18400 kyc., chassis 1204-A. Marshall T. Bond, 8718 Linkfair lane, Houston, TX 77025. (713) 668-0029.

****

FOR SALE: 1940'S VINTAGE ZENITH CONSOLE radio and phonograph. Cabinet is in excellent condition. $250.00 — Call (815) 838-5398. 5 p.m. to 10 p.m. c.s.t. Dick Stauss, Rt. 1 Box 399, Lockport, IL 60441.

****

WANTED — CRYSTAL SET

HOMEBREW CRYSTAL SET. Dial type mounted on nice wooden cabinet. Vernon Kostohryz, 600 Lakeside 3A, Brownsville, TX 78520. (512) 541-5692.

WANTED — EDISON

WANTED FOR EDISON STANDARD phono— model B. 1.) mainspring 2.) decals-trademark and "Edison, 3.) cabinet lid 4.) A. K. breadboard in excellent condition. Carl Hickey, 27404 N. Highway 1, Fort Bragg, CA 95437. (707) 964-0505.

WANTED — GENERAL

WANTED: 1946-1948 RCA Victor "Globe-Trotter" portable radios in excellent working condition. Models 66BX & 8BX6. ALSO WANTED: 1920's Holton alto saxophone, having a 5 digit serial #, starting with # 1 or 2. Bell diameter must be at least 5" across. Absolutely no smaller. Send photo & complete description to: Saxophone, P.O. Box 773, Wausau, WI 54401.

SET OF 7 BAND CHANGING PUSHBUTTONS for Zenith Trans-Oceanic (slide rule type dial), manuals or copies for: Waterman 517A pocketscope, Electro-logic V1 (spinning drum type) Digital voltmeter. Peter J. Ben, 222 Parkview Terr., Lincroft, NJ 07738.

GOOD DIALS FOR PHILCO 37-62 (p/n 27-5287), Emerson 565 AM/FM, & Sonora RCU-208; Good cabinet GE A-65, Rider Vols. 20, 21, 23; Richard Brown, 117 Meisel Avenue, Springfield, NJ 07081. (201) 467-9628.

BATTERY TYPE "RADIOLA" that fits into the Brunswick model BR100 radio phonograph unit. Also, any info or literature on same. Dick Roznovsky, Box 480, Richfield, OH 44286.

WANTED. Oscilloscopes of the 30's. Not working ok if complete, inside & out. Also want 1" to 3" CRT's for early scopes. Have many radios, TVs, parts & literature to swap or will buy. John Kendall, P.O. Box 436, Fallston, MD, 21047.

OLD FIDDLES/ VIOLINS, BANJOS OR MANDOLINS, ETC. ANY CONDITION IF REASONABLE PRICE. THE OLDER THE BETTER. ALSO DO REPAIRS ON FIDDLES/ VIOLINS. CALL OR WRITE JAMES BARNES, 7812 TAZEWELL PIKE, CORRY-TON, TN 37721.

OLD BROADCAST OPERATOR IN ARIZONA

INTERESTED IN OLD RADIO MEMORABILIA; PAPERS, OLD TUBES, NOVELTIES, SMALL RADIOS, AND COMPONENTS OF THE TWENTIES AND THIRTIES. HAVE RADIOLA 25 WITH LOOP, 6A40 ZENITH WAVEMAGNET, PHILCO 32V FARM RADIO, R.C.A. NAVY SHIP RECEIVER, EICO 950 RC BRIDGE, GERMAN RADIOS, WILCOX GAY TAPE AND RECORD PLAYER, BC 348 RECEIVER, SYLVANIA METAL TUBE CABINET, SYLVANIA JACKET, TUBES, CHOKES, METERS, TRANSMITTER COLLINS 32V3, EICO 720, W.E. INTERCOM AND A FEW W.E. TUBES, GONSET COMMUNICATOR IV, GRAY AUDOGRAPH, STENTYPE MACHINE AND QUACK MEDICAL MACHINES. LIKE TO HEAR FROM COLLECTORS... WAYNE FERNYHOUGH, 1632 W. ROVEY AVENUE, PHOENIX, AZ 85015.

GLASS TUNING DIAL FOR MOTOROLA 5T, ZENITH TOMBSTONE, (AKA WALTON'S RADIO), PHILCO 16B, 90, 70 AND ANY OTHER CATHEDRALS OR TOMBSTONES. MIKE BUKOWSKI, 926 CROWNRIDGE DRIVE, COLORADO SPRINGS, CO 80904

WANTED. BROWN BAKELITE KNOB and 199 tube socket from Steinite model 990 seris radios. Ed Clerkin, 1305 San Marcos Ct., San Luis Obispo, CA 93401. (805) 544-3088.

WANTED: A WIRE RECORDER for playing 3 3/4" spools of recording wire. Used navy equipment. Russell Starkey, 855 Eisenhower Avenue, Jasper, IN 47546. Phone (812) 482-1016.

SIDE TUNING KNOB FOR BELMONT 6D111, manual and schematic for measurements model 80 and Heathkit LG-1 signal generators, RIDERS vols. 16-23, and SAMS 1-700. Looking for a book by the title of "Case Histories of Receiver Troubles and their Remedies," published by Rinehart Books in addition to a hard-cover copy of Tyne's "The Saga of the Vacuum Tube." Am also interested in contacting other collectors in Columbus, Ohio area. Brett Gundlach, 276 E. COMO AVE., COLUMBUS, OHIO 43202, HOME 614) 267-0346, WORK (614) 888-9502.

RADIOLA 28 with 104 speaker, Radiola 25, Radiola 20, Norden Hauck Superhet, Leutz Superhet, Pilot Super Wasp, Pilot parts, Crosley parts, Atwater Kent parts and AK breadboard parts, RCA UZ-1320 horn, Radiola RS, Zenith Super VII or VIII, crystal sets, Burns horn, Emmett A. Smith, 2714 Alden Road, Baltimore, MD 21234.

WANTED— CABINETS FOR RADIOLA X, AND FEDERAL 59, DISPLAY SODION TUBE, UNUSUAL HAND KEYS, INFORMATION ON HALLECK-WATSON COMPANY OF PORTLAND, OREGON. PAT STEWART, W7GVC, 1404 RUTH AVE., WALLA WALLA, WA 99362.

WANTED: ZENITH 11 OR 12 BAND "TRANS-OCEANIC" TRANSISTOR, TOSHIBA "GLOBE-TROTTER," SONY "ORBITER" RECEIVERS OR PARTS, ALSO KLH-21 FM ONLY RADIO. BILL WADE, 657 14TH AVENUE, PROSPECT PARK, PA 19076.

WANTED: ENTIRE WORKS for Capehart 500K, also Edison C-1, C-2, Balmoral and Alva, Victor 10-51A, Tom Grattelo, 2818 Central, Alameda, CA 94501.

PEERLESS MODEL 19AR-60 9" DYNAMIC speaker with cabinet in good working condition. H-P model 410C VTVM working. RCA Victor R-35 radio in excellent working condition. Simpson model 1699 milliohmmeter in working condition. Radiola 20 chassis with good audios. Audio transformer for RCA Victor R15 or RCA Radiola 48. Radio Broadcast magazines for 1922 and 1928. Early Canadian Radio magazines such as Canadian Wireless, Radio, etc. Radio News for July, August and October 1919. October 1921, January 1922, August and September 1924. Top prices for good condition magazines. R. A. McNeill, P. O. Box 472, Yorkton, Sask., Canada S3N 2W4 (306) 783-6121.

WANTED: DECANTER BOTTLES, ice bucket, shot and drinking glasses for model 9008-B Porto-Baradio made by Stewart Warner. Clarence MCGinnis, 1507 N. Glenn Street, Morristown, TN 37814.

WANTED: OWNERS OF EARLY ELECTRICAL magazines, MODERN ELECTRICS, ELECTRICIAN & MECHANIC, etc. I will pay for good photocopies of articles on spark gaps, high frequency Tesla & Oudin coil projects, etc. Need information for forthcoming bibliography. Write first to TCBA, RD3 Box 181, Glens Falls, NY 12801.

WANTED: WWII MILITARY Iconoscope TV camera or tube alone. OK if converted to amateur use. Canadian Marconiphone III regen., IV neutragenaflex, VI, VIIA, VIII, IX, XI. Canadian Westinghouse model W55, W55A, W60A, W57. Hammarlund Trans-Oceanic "Two", De Luxe, Hawk. Kresge Z4 Commander, Karas Short Wave Receiver. D'Arcy Brownrigg, P.O. Box 292, Chelsea, Quebec, JOX 1NO, Canada.

WANTED: A. K. MODEL 55, need everything to mate with gear on tuning condenser. Could also use but not so critical speaker or cone for above. Floor cabinet model, need ivory knob, prefer function for FADA mdl. 790. Will buy junk A.K. if it has at least the tuning parts. C. England, 98 Montague, So. Zanesville, OH 43701.

WANTED: COVER FOR A.K. 55 tin box. Also, 4 tube covers for Advance Neutrowound. Will buy junk set. Jerome Schliepp, 831 Old Berlin Road, Rippon, WI 54971.

C-4 TUBE. for Columbia radio model C-80A. SPRING AND PLATE for A.K. speaker model M. Russ Schoen, E 7340 Nietkze Road, Clintonville, WI 54929. (715) 823-6744.

I BUY BATTERY RADIOS and horns from the 20's, if you have one to sell, send me a card with name, model and price. Rick Parrish, 1260 marilyn Drive, Cape Gir., MO 63701.

WANTED: ZENITH OCEANIC 7000, TOSHIBA- GLOBAL, GRUNDIG SATELLITE OR SONY "ORBITER" BATTERY MULTIBAND SET, WADE, 657 14TH AVENUE, PROSPECT PARK, PA 19076.

WANTED: ONE VERY NICE RADIOLA 100 A LOUD SPEAKER, PLEASE WRITE: PAUL O'PATIK, 316 RUTHERFORD AVENUE, FRANKLIN, NJ 07416.

DO YOU HAVE THAT CLASSICAL 78 ALBUM that has a damaged or missing record? I have an "album singles for sale" listing that I will send to anyone for a 25 cent long self-addressed stamped envelope. Anton Johannes, R.D. #3 Box 253, Pine Bush, NY 12566.

WANTED. I BUY RADIO TV collections. Please send description and price desired. John Kendall, P. O. Box 436, Fallston, MD 21047.

WANTED— SCHEMATIC, ETC. ON BLUE RIBBON AND REMINGTON 5 TUBE RADIOS, OR OTHER RADIOS LIKE THE ABOVE. WANT TO GET THEM WORKING WITH ORIGINAL PARTS. W. G. WEAMER, 390 E. FOSTER ROAD, SANTA MARIA, CA 93455.

WANTED "TENSOR ANALYSIS OF NETWORKS" by Kron; Briggs and Stratton crystal set; accessories for "smokerette" radio. Forrest Baker, 1558 W. Garfield, Davenport, IA 52804.

WANTED — HAMMARLUND

HAMMARLUND CONDENSERS, MC-100, MC50, MCD-35FX, NORMAN CRANE, KF7AS, P.O. BOX 12564, TUCSON, AZ 85732. 749-9140.

WANTED — HEADPHONES

WANTED: NONWORKING OR WORKING headphones: Mesco, Kennedy, Eisemann, Sampson, Kilbourne Clark, Kellog, Brownies, earliest Brandes with steel headband. Vernon Kostohryz, 600 Lakeside 3A, Brownsville, TX (512) 541-5692.

WANTED — LEUTZ

WANTED FOR LEUTZ MODEL "C" superhet.: 2 Weston No. 301 voltmeter 0 - 10 volts DC. 2 Weston no. 301 ammeter 0-5 amps. DC. 4 General Radio type 231 A audio transformer. 6 special Leutz I.F. transformers. 1 special E.I.S. (Leutz) oscillator coil. 1 special E.I.S. (Leutz) R.F. coupler coil. John A. Rawlins, Jr., 1920 Stephenson Drive, Mesquite, TX 75149. (214) 285-2313.

WANTED — LITERATURE

INSTRUCTION MANUAL FOR EICO MODEL 950 A RC BRIDGE CONDENSER CHECKER. H. F. BRAMMELL, 24 E. MAPLE, AMERICUS, KS 66835.

"WANTED — Operating/ Instruction Manual for Precision signal generator series E-200 and for Sprague Tel-Ohmike resistor condenser analyzer model TO-3. F. Schmidt, 1185 E. Via Entrada, Tucson, AZ 85718"

WANTED: TESLA SUPPLEMENT from the May 1912 MODERN ELECTRICS. Good photocopy OK. Price of no concern. TCBA, RR6, Box 181, Glens Falls, NY 12801.

WANTED OPERATING MANUAL for Precision Tube and Multi-tester #954 Zerox copy OK. Will pay. John G. McDade, #214, 204 E. Joppa Road, Towson, MD 21204.

WANTED: SCHEMATIC TEL-SWEEP GENERATOR. MODEL TSW-50-1948 VISION LABS, JOHN G. MC DADE, 204 E. JOPPA ROAD, #214, TOWSON. MD 21204.

EVERY DAY MECHANICS, VOL. I, NO. 4, MAY 1916 OR A COPY OF "HOW TO BUILD A TRANS- ATLANTIC WIRELESS RECEIVING SET. K. A. LADD, 5240 44TH AVE. S., MPLS., MN 55417. (612) 722-6786.

LAFAYETTE RADIO CATALOGS - 1960 THRU 1968, PLEASE STATE CONDITION AND PRICE. MR. MICHAEL S. SABODISH, SR., 11 - A MATAWAN AVENUE, CLIFFWOOD, NEW JERSEY 07721.

WANTED: OPERATING MANUAL and tube data sheets for Jackson Dynamic tube tester model 636. Zerox copy O.K. Frank Hoffert, 19605 Chardon Road, Cleveland, OH 44117.

WANTED - INFORMATION AND SCHEMATIC for Blaupunkt Sultan 3D radio. Model number unknown, 5 tube AM/ FM/ SW. Write Ray Carifio, N4LTS,

6014 SW 33rd Street, Miami, FL 33155

WANTED: LIBRARY BOUND volumes of QST, CQ, 73 PRE 1960. ALSO GLOBE SCOUT (WRL), MIKE GRIMES, K5MLG, 3805 APPOMATTOX CIRCLE, PLANO, TX 75023.

WANTED: SCHEMATIC FOR SILVERTONE MODEL 7166. TOM JOHNSON, 215 E. 7TH STREET, AMES, IA 50010.

WANTED: SCHEMATIC AND INFO on Eico ST 70 amplifier. Gordon Wilson, 11108 - 50 Avenue, Edmonton, Alberta, Canada T6H 0H9.

WANTED: INSTRUCTIONS FOR PACO MODEL 25 IN-CIRCUIT CAPACITOR TESTER RCA WR-50A SIGNAL GENERATOR CRYSTALINER (CRYSTAL MODULES) GENERATOR, GLENN HARTMAN, 5545 DEEP HOLLOW, FAYETTEVILLE, NC 28311.

WANTED — PARTS, TUBES, ETC.

MACHINES SCREWS TO HOLD PANEL TO CABINET, RADIOLA III AND IIIA, I NEED TWO DOZEN. ERNEST HECKLER, 1314 N. SPARKMAN, HARTSELLE, AL 35640.

WANTED — BATTERY RADIO CHASSIS AND/OR ANY INFORMATION ON BRUNSWICK RADIOLA PHONOGRAPH, MODEL BR100, PATENT 1923 — DICK ROZNOVSKY, BOX 480, RICHFIELD, OH 44286.

WANTED: CABINET & AUDIO TRANSFORMERS FOR GREBE CR9, ARTHUR HARRISON, 501 ARBOR DRIVE, COLUMBIA, MO 65201. (314) 474-8729.

DIAL TUNING KNOB AND RESET LOCK SCREW FOR A WARDS 62501 TABLE MODEL RADIO, RIDER 10 - 22, H. F. BRAYMELL, 24 E. MAPLE, AMERICUS, KS 66835.

ZENITH DETECTOR COIL NO. S-8436 USED IN CH, 10A1, 10A2, 10B1, 10B2. ATWATER KENT MODEL 60 A.F. TRANSFORMER ASSEMBLY. L49B BALLAST TUBE. 45 RPM SPINDLE FOR B5R C129 CHANGER EV/GAME 436. CABINET FOR PILOT TV 37. 3KP4 CRT. ELECTRONICS MEASUREMENT CORPORATION. MODEL 502 SIGNAL GENERATOR, ASSEMBLY MANUAL OR SCHEMATIC. AUDIO INPUT XFMRS FOR SINGLE PLATE TO P-P GRIDS. ANY JUNKBOX PARTS, LITERATURE. ANY EARLY TWO AND THREE PIECE CAR RADIOS, UNITED MOTORS, B.O.P., ETC. ANY OTHER FACTORY CAR RADIOS FROM 30'S - 40'S. ANY SIGNAL SEEKING TYPE CAR RADIOS, MUST HAVE KNOBS. CAR RADIO KNOBS. — ALVIN HECKARD, RD1, BOX 83, LEWISTOWN, PA 17044.

EARLY OR UNUSUAL TUBES, tube cans, cartons also early light bulbs pre 1900. Please describe with prices wanted to: Bruce Harbeck, 13408 Westwood Lane, Omaha, NE 68144. (402) 333-9013.

HALLDORSON 3 to 1 audio transformer, copper casing. hard rubber panel 10 x 11 x 1/4. Gordon Wilson, 11108 - 50 Avenue, Edmonton, Alberta, Canada, T6H 0H9.

DETECTOR and AUDIO PORTION of GREBE CR2. Also need cabinet for same. NEED FRONT PANEL FOR SCOTT Phantom DELUXE. Larry Steeno, 2728 42nd Street, Two Rivers, WI 54221. (414) 794-7320.

MARCONIPHONE VIII cabinet, also Marconiphone VI chassis, or complete radios cash, or generous trade. Gordon Wilson, 11108 - 50 Avenue, Edmonton, Alberta, Canada, T6H 0H9.

WANTED: EMPTY CABINET for a Philco model 20 cathedral radio. I already have the radio and speaker. Must be in good condition. Joe Beach, 6515 Sunset, Garden City, MI 48135.

WANTED— CABINET AND PARTS FOR A FEDERAL 61. Mike Kibler, 300 Speiter #39, Danville, IL 61832. (217) 267-3703.

WANTED: ONE TUNING DIAL and one coil tap knob for a Crosley model XJ. Jack Emery, Box #84, 5546 Union Street, Lexington, MI 48450.

TUBES: EARLY UV-217, type CA pliotron, DeForest DV-1 and DV-6, adapter for DeForest type T audion to fit candelbra socket. Parts: rheostat assembly and knob for Tuska 224 rcvr.; case w/hardware for Radiola balanced amplifier. B. T. Wooters, W5KSO, 8303 E. Mansfield Avenue, Denver, CO 80237, (303) 770-5314.

WANTED — PHILCO

PHILCO MODEL 20B 1930 "Baby Grand" radios. Original finish, and no chassis changes a must. Must be conpletely original and in working condition. Will pay top price for a real nice one. All replies will be answered. Write: Ronald G. Burtzos, 915 Crane Drive, Apt. 703, DeKalb, IL 60115.

PHILCO MODEL 90B, working or not. Original speaker from Philco model 20— must be in good shape. Thomas Abell, 1022 S. Edison Ave., South Bend, IN 46619. Phone (219) 234-8405.

CHASSIS ONLY FOR PHILCO cathedral, model 37-61, Charles A. D'Alessio, 136 Changebridge Road, K4, Montville, NJ 07045. ((201) 263-4747.

WANTED — PLASTICS

WANTED: CATALIN RADIOS. All makes: FADA, OSWALD, EMERSON, MOTOROLA, etc. Top prices paid. R. Wayne Oliver, 355 Highwood Avenue, Leonia, NJ 07605. (201) 944-0777.

WANTED — SONY

WANTED: OLD SONY radios. Jay Lewin, 400 east 54th Street, New York, NY 10022. (212) 935-5656.

WANTED — ZENITH

ZENITH TRANSISTOR Trans-Oceanic 11 or 12 band radio- parts or complete. Have Rider TV manuals 2 thru 23 for offer. Wade, 657 14th Ave., Prospect Park, PA 19076.

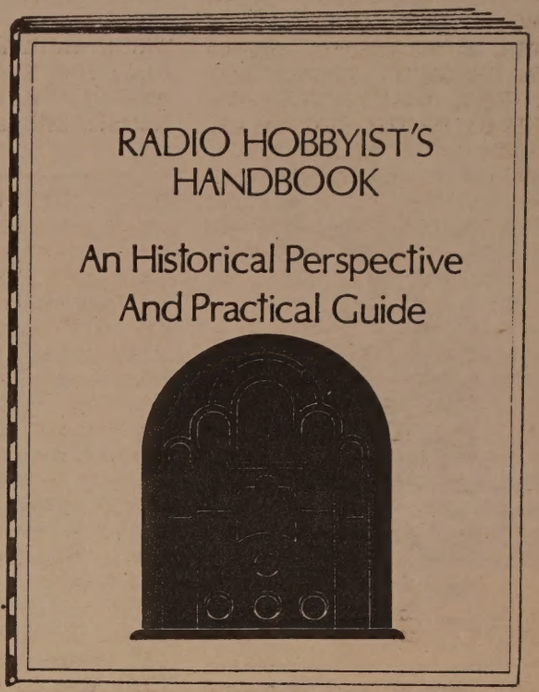
New Release

ARS Enterprises has just introduced a new reference book for radio hobbyists and collectors. RADIO HOBBYIST'S HANDBOOK - An Historical Perspective and Practical Guide provides a good background on the development of the precursors of radio: communications technologies and recorded sound devices, as well as much valuable information about how sets work and the best ways to repair them.

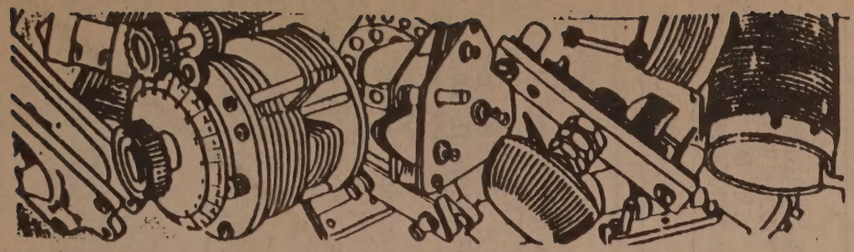
The book traces Edison's work, Bell's breakthroughs, the use of Morse code, and much more. Then it teaches you about electronics, radio components and operation.

How to use servicing diagrams is discussed in detail and quite a bit of information on sources of service data is provided. Then it finishes up with a nice glossary of common terms used in radio and electronics.

One of the nicest basic guidebooks we've seen. It is available from ARS Enterprises, P.O. Box 997, Mercer Island, WA 98040 for $9.95 plus $2.50 shipping (total $12.45). Item P-11.



ARS Enterprises, P.O. Box 997, Mercer Island, WA 98040



OLDE TYME
RADIO CO.

Need hard to find Olde Tyme Radio parts such as:

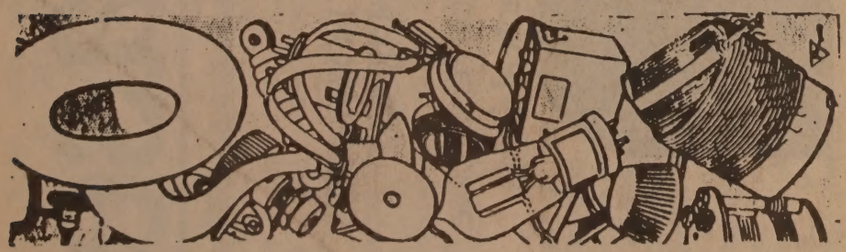
* Antique twisted, black, 2-wire cloth covered cord.
* AK Style Battery Cable
* Olde Tyme Hookup Wire
* Brown Silk Type Power Cord
* Gold Silk Type Power Cord
* Audio, Interstage & Output Transformers
* Vintage Tubes
* Headphones
* Headphone & Speaker cords
* Ant, RF, OSC & IF Coils
* Speaker Grill Cloth
* Pilot lamps
* Olde Tyme Ball Handle toggles switches

ALSO CAN PROVIDE REPRINTS OF THE FOLLOWING OLDE TYME RADIO PUBLICATIONS:

- Atwater Kent Instruction Manuals, Volumes 1,2,3 & 4
- Atwater Kent Equipment Catalog
- Radiola III/IIIA Manual
- VINTAGE RADIO IDENTIFICATION SKETCHBOOKS by D.H. Moore (See Flyer for details)
- Radios, The Golden Age - Philip Collins

and much, much more. Data Packages for American radios manufactured during the 1920's thru 1950's period plus our special research service for unknown model numbers are available. For free flyer send 2-stamp LSASE to Olde Tyme Radio Co., 2445 Lyttonsville Road, Silver Spring, Md. 20910.

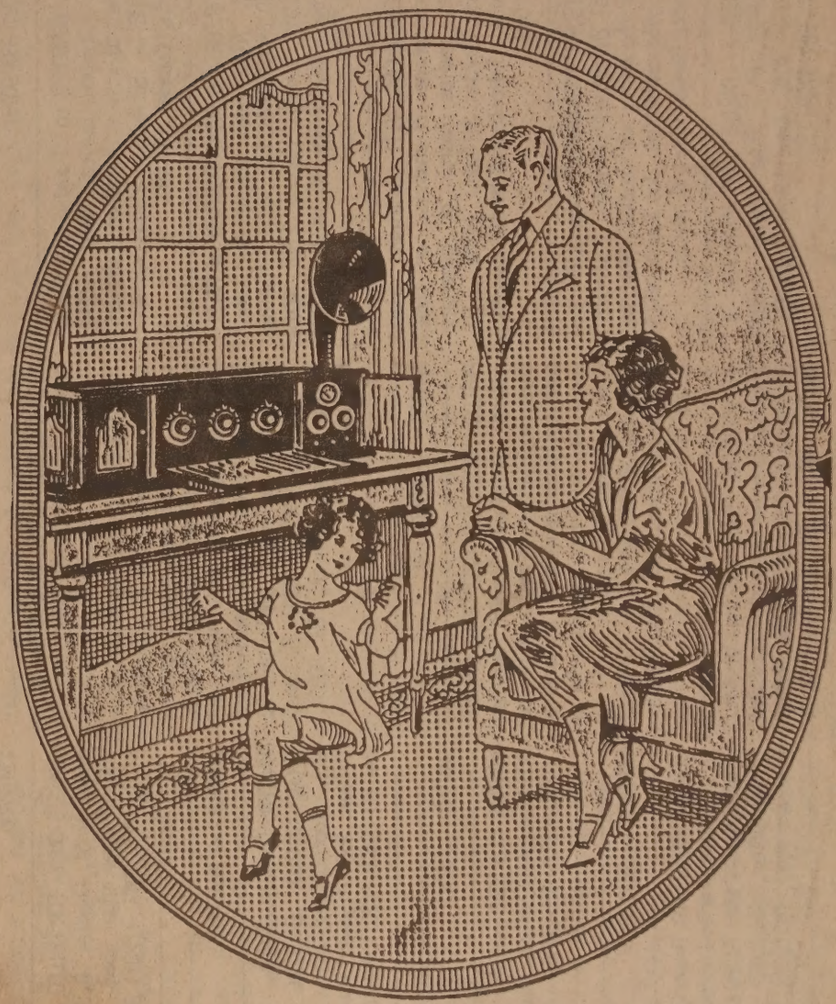
Wish to reach us by phone? the number is (301) 585-8776. Please call between 10:00 AM and 10:00 PM local time.



November

THE HORN SPEAKER

1988



58905 CORB
ART B CORBUS
5704 11TH AVE NW
SEATTLE WA 98107